



Allergy: Volume 76, Issue S110

Special Issue: Abstracts from the European Academy of Allergy and Clinical Immunology Hybrid Congress, 10-12 July 2021

Pages: 1-693
November 2021

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Abstracts from the European Academy of Allergy and Clinical Immunology Hybrid Congress, 10-12 July 2021

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Issue Information

Pages: 1-4 | First Published: 15 November 2021

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Pages: 5-17 | First Published: 15 November 2021

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875 | Environmental DNA analyses reveal links between abundance and composition of airborne grass pollen and population scale respiratory health.

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Background: Grass (Poaceae) pollen is the most important outdoor aeroallergen, exacerbating a range of respiratory conditions, including allergic asthma and rhinitis. Understanding the relationships between respiratory diseases and airborne grass pollen with view to improving forecasting has broad public health and socioeconomic relevance. Yet, the relative contributions of the >11,000 (worldwide) grass species to respiratory health outcomes have been unresolved, as grass pollen cannot be readily discriminated to species level using standard microscopy. However, emerging opportunities focusing on environmental DNA analyses, combined with spatio-temporally resolved epidemiological data offer novel population level insights into linkages between taxonomically resolved pollen data and disease.

Method: We used novel environmental DNA (eDNA) sampling and combinations of quantitative PCR (qPCR) and metabarcoding, to measure the composition and relative abundances of airborne pollen from common grass species, during two grass pollen seasons (2016 and 2017), across the UK. Using a series of generalised additive models (GAMs), we explore the relationship between the incidences of species level airborne pollen and severe asthma exacerbations and prescribing rates of drugs for respiratory allergies.

Results: We quantitatively demonstrate discrete spatiotemporal patterns in airborne grass pollen assemblages. Our results indicate that a subset of grass species may have disproportionate influence on these population-scale respiratory health responses during peak grass pollen concentrations.

Conclusion: The work demonstrates the potential for sensitive and detailed biomonitoring of harmful aeroallergens in order to investigate and mitigate their impacts on human health.

716 | Betula: tree with stable pollen season promoting pollen-food syndrome

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Background: Betula is a tree species in the Eastern Europe, which is a key factor of seasonal allergy. The latest data suggest that birch pollen sensitization promotes cross-reactivity to related food allergens. The aim of our study was to analyse Betula pollen season over the decade and sensitization to its pollen in Ukraine.

Method: Pollen collection from 2009 to 2020 used volumetric methods employing a Burkard trap placed at a height of 25 meters above the ground on the roof of a Vinnitsa Medical University, Ukraine. Samples taken from February until November were analyzed by mean of three horizontal transects in years 2009-2011 and by mean of twelve vertical transects at a bi-hourly mode in years 2012-2019 under the light microscope with x400 magnification. Trends for changing of season parameters were calculated using the excel program. Sensitization was assessed by 8016 ALEX tests performed in different regions of Ukraine in 2017-2019 in patients from 1 to 78 years old.

Results: All tree species analyzed including Corylus, Alnus, Carpinus, Fraxinus, Quercus, but except Betula demonstrated expressed tendency to early season start and early seen peak and variability of other indices including either shortened or prolonged pollen season, and changing pollen index with the most variability seen for early-flowering Alnus and Corylus. However, only Betula demonstrated tendency to later start and all other indices like peak day, peak value, pollen index were stable over the study period. Just a little tendency to season shortage was observed. Analysis of sensitization to Betula allergens was not so surprising. Despite it was recorded in all regions of Ukraine, the highest rates were seen in the Western and Northern regions of our country, which are located in forest zone. Up to 62 % of people with Betula sensitization in the Forest zone were also sensitive to the Mal d allergens expressing pollen-food syndrome.

Conclusion: Despite it is widely reported that climate change affects plant pollination all over the world; it does not affects much Betula specie, namely, in Ukraine. Its season looks very stable and unchanged over the last decades. The highest sensitisation rates to Betula pollen are seen in Forest zone with up to 62% of patients sensitive to apple allergens.

718 | Symptoms year round: up to 40 % of pollinosis' sufferers in Ukraine are sensitive to allergens of all pollen groups

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Background: Pollen forecast is important tool for control of seasonal allergy symptoms. It is considered that pollen data can be interesting to up to 30% of European population sensitive to pollen and molds. In practice, people use pollen forecast just at the time when they experience the symptoms. However, among those can be a group of patients, polysensitized to different outdoor airborne allergens.